Possible mechanisms of antinociception of methanol extract of Melastoma malabathricum leaves

ABSTRACT

Melastoma malabathricum L., Melastomaceae, has been traditionally used to relieve diverse pain-related ailments. The objectives of the present study were to determine the antinociceptive activity of methanol extract of M. malabathricum leaves and to elucidate the possible mechanisms of antinociception involved using various rats' models. The extract (100, 250, and 500 mg/kg) was administered orally 60 min prior to subjection to the respective test. The in vivo acetic acid-induced abdominal constriction, formalin-induced paw licking, and hot plate tests were used as the models of nociception to evaluate the extract antinociceptive activity. Further studies were carried out to determine the role of opioid and vanilloid receptors, glutamate system and nitric oxide/cyclic guanosine phosphate (NO/cGMP) pathway in modulating the extract antinociceptive activity. From the results obtained, M. malabathricum exhibited significant ($p < 0.05$) antinociceptive activity in all the chemical- and thermal-induced nociception models. Naloxone (5 mg/kg), a non-selective opioid antagonist, failed to significantly affect the antinociceptive activity of MEMM when assessed using the abdominal constriction-, hot plate- and formalin-induced paw licking-test. M. malabathricum also significantly ($p < 0.05$) reversed the nociceptive response in capsaicin- and glutamate-induced paw licking test. Furthermore, only l-arginine (a nitric oxide precursor) alone, but not, N^G-nitro-l-arginine methyl esters (l-NAME; an inhibitor of NO synthase), methylene blue (MB; an inhibitor of cGMP), or their combination thereof, significantly ($p < 0.05$) block the antinociceptive activity of M. malabathricum. In conclusion, M. malabathricum exerted a non-opioid antinociceptive activity at the central and peripheral levels partly via the inhibition of vanilloid receptors and glutamatergic system, and activation of the NO-mediated/cGMP-independent pathway.

Keyword: Melastomaceae; Herbal; Pain-killing; Natural products; Drug discovery